1.2 Defining Limits

Limits

As $x$ approaches $\_ \_ \$, $f(x)$ approaches $\_ \_ \_ \_ \_.

\[
\lim_{{x \to 2}} f(x) = \quad f(2) =
\]

Use the following graph to evaluate each problem.

1. $\lim_{{x \to 1}} f(x) = \quad 2. \ f(-3) =

3. $\lim_{{x \to 2}} f(x) = \quad 4. \ f(2) =

5. $f(1) = \quad 6. \ f(-2) =

7. $\lim_{{x \to 0}} f(x) = \quad 8. \ \lim_{{x \to -3}} f(x) =

9. Give an interpretation of the statement $\lim_{{x \to 7}} f(x) = 10$

A limit does NOT tell us the value of $f(x)$. It just tells us what the function approaches!

True or false? $f(1) = \lim_{{x \to 1}} f(x)$ in all cases.

True or false? $f(1) \neq \lim_{{x \to 1}} f(x)$ in all cases.
### 1.2 Defining Limits

**Calculus**

Give an interpretation of each statement.

1. \( \lim_{x \to 1} f(x) = 9 \)
2. \( \lim_{x \to -2} f(x) = 3 \)
3. \( \lim_{x \to 4} f(x) = -8 \)

Use the following graph to evaluate each problem.

4. \( f(-2) = \)
5. \( \lim_{x \to 1} f(x) = \)
6. \( \lim_{x \to -2} f(x) = \)
7. \( \lim_{x \to 0} f(x) = \)
8. \( f(4) = \)
9. \( \lim_{x \to 4} f(x) = \)
10. \( \lim_{x \to -4} f(x) = \)
11. \( f(1) = \)

Use the following graph to evaluate each problem.

12. \( \lim_{x \to -1} f(x) = \)
13. \( \lim_{x \to 3} f(x) = \)
14. \( f(2) = \)
15. \( \lim_{x \to -2} f(x) = \)
16. \( \lim_{x \to 1} f(x) = \)
17. \( f(3) = \)
18. \( f(-1) = \)
19. \( \lim_{x \to 2} f(x) = \)

Use the following graph to evaluate each problem.

20. \( \lim_{x \to 2} f(x) = \)
21. \( f(1) = \)
22. \( \lim_{x \to 3} f(x) = \)
23. \( \lim_{x \to -2} f(x) = \)
24. \( \lim_{x \to 1} f(x) = \)
25. \( f(-2) = \)
26. \( \lim_{x \to -3} f(x) = \)
27. \( f(3) = \)
Use the following graph to evaluate each problem.

<table>
<thead>
<tr>
<th>x→2 f(x)</th>
<th>x→1 f(x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td></td>
</tr>
</tbody>
</table>

28. \( \lim_{x \to -2} f(x) = \)

29. \( \lim_{x \to 1} f(x) = \)

30. \( \lim_{x \to 2} f(x) = \)

31. \( f(-2) = \)

32. \( f(1) = \)

33. \( \lim_{x \to 0} f(x) = \)

34. \( \lim_{x \to -4} f(x) = \)

35. \( f(2) = \)

### 1.2 Defining Limits

36. Let \( f \) be a function that is defined for all real numbers \( x \). Of the following, which is the best interpretation of the statement \( \lim_{x \to 4} f(x) = 8 \).

(A) The value of the function \( f \) at \( x = 4 \) is 8.

(B) The value of the function \( f \) at \( x = 8 \) is 4.

(C) As \( x \) approaches 4, the values of \( f(x) \) approach 8.

(D) As \( x \) approaches 8, the values of \( f(x) \) approach 4.

37. Let \( f \) be a function that is defined for all real numbers \( x \). Of the following, which is the best interpretation of the statement \( \lim_{x \to -1} f(x) = 2 \).

(A) As \( x \) approaches 2, the values of \( f(x) \) approach \(-1\)

(B) The value of the function \( f \) at \( x = -1 \) is 2.

(C) The value of the function \( f \) at \( x = 2 \) is \(-1\).

(D) As \( x \) approaches \(-1\), the values of \( f(x) \) approach 2.